NEW MEXICO TECH
SCIENCE • ENGINEERING • RESEARCH UNIVERSITY

Smart Grid Progress

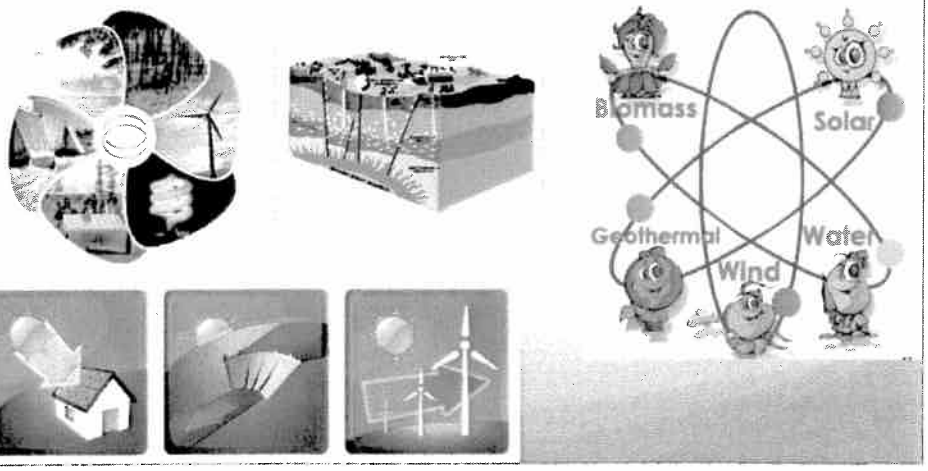
Dr. Van Romero
Vice President
Research & Economic Development

- Energy efficiency can eliminate more than 20% of the world energy demand by 2020[1]
- New Mexico is 3rd in the nation for Solar Power Potential[2]
- New Mexico is the 12th in the nation for Wind Power Potential[3]
- New Mexico is a high potential for Geothermal energy[4]

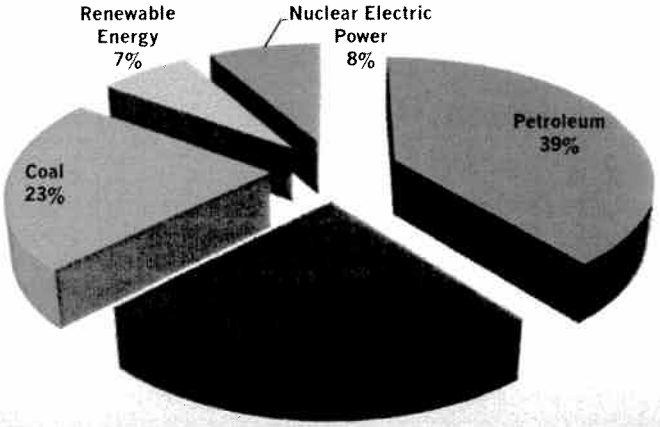
[1] *Time*, December 31, 2008
[2] Based on sun index level
[3] American Wind Energy Association
[4] GeoPowering the west, US DoE

New Mexico Green Grid Initiative

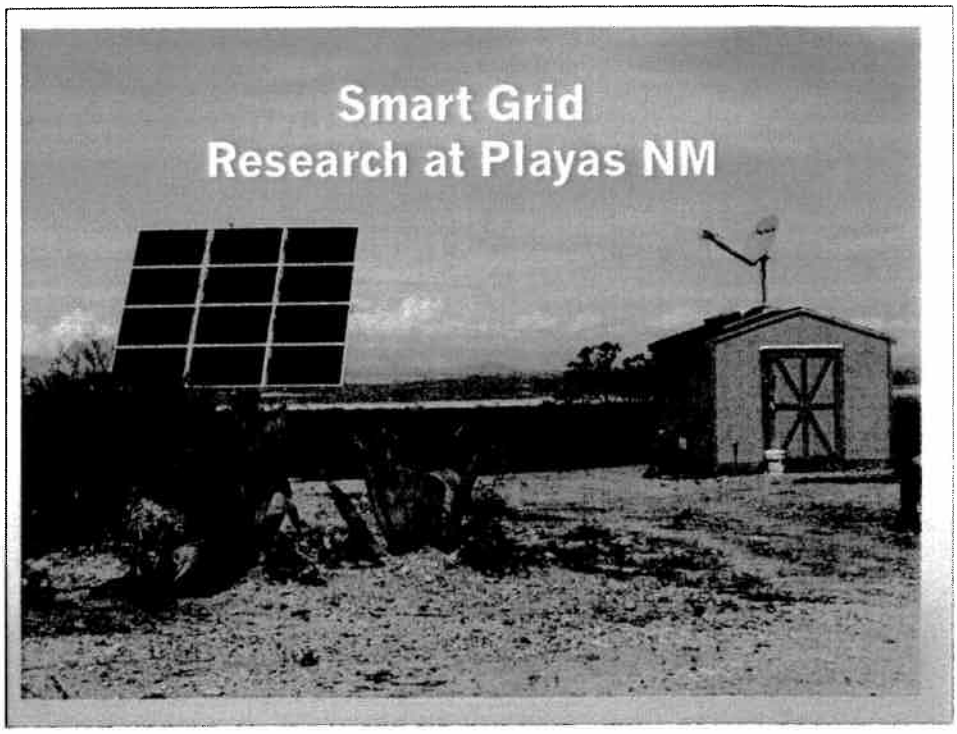
"New Mexico will take a leadership role in the rapidly emerging green economy"



U.S. Primary Energy Consumption by Source, 2007



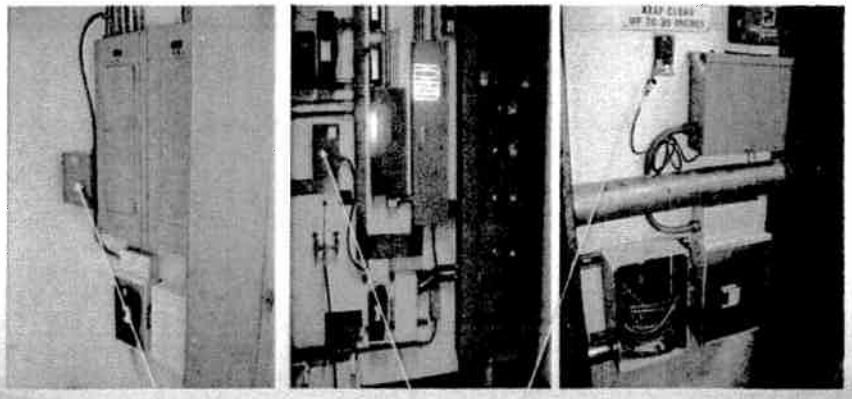
Source:



Playas Project Goals and Objectives

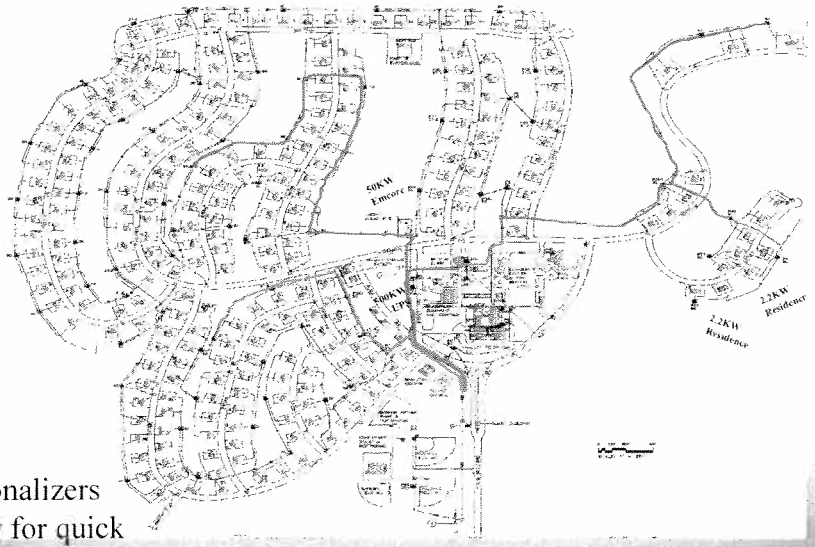
- Utilize the unique facilities at Playas, NM
- Implement SCADA and Web based communication and control of loads in the entire town of Playas
- Further Instrument the Playas Microgrid
- Design of 500KW Islanded MicroGrid with electrical storage
- Operate the MicroGrid and power critical infrastructure
- Design 2 intelligent home energy systems using next generation component
- Sub Meter all critical buildings using Web based 2 way communications
- Evaluate the Next Generation of Renewable Energy Technologies (Albuquerque, Socorro and Playas)

Sub Meters installed at the 3 largest power consuming buildings



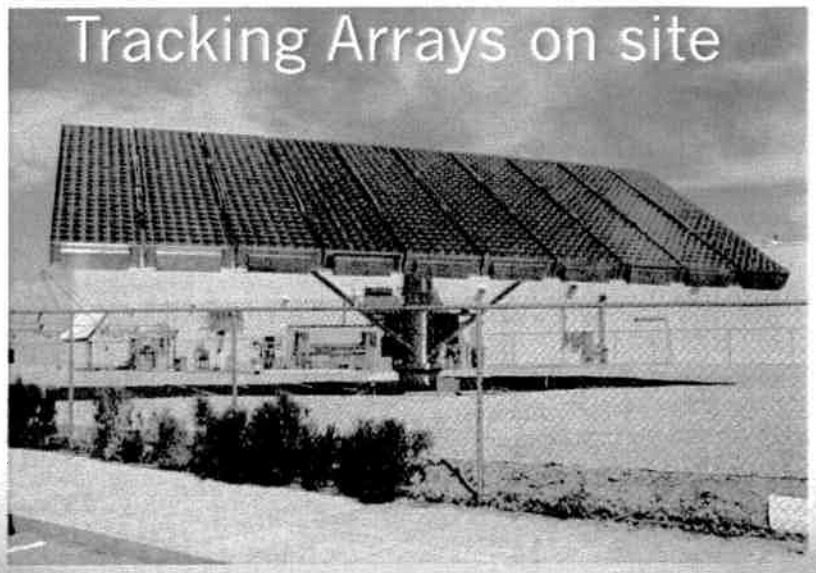
Ethernet, Wireless, or Fiber Optic Communications ready

Electrical Diagram of Playas

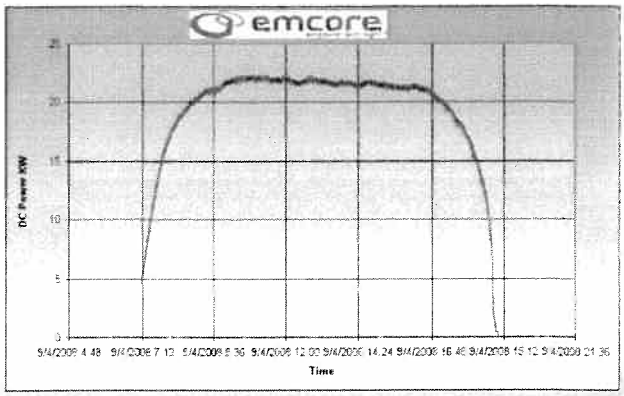


Sectionalizers
Allow for quick
Isolation of Phases

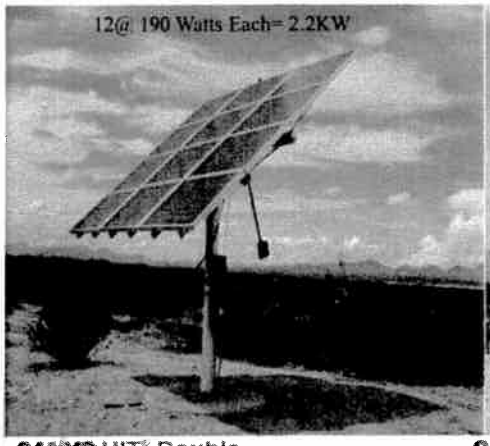
2 Each 25KW CPV Sun Tracking Arrays on site

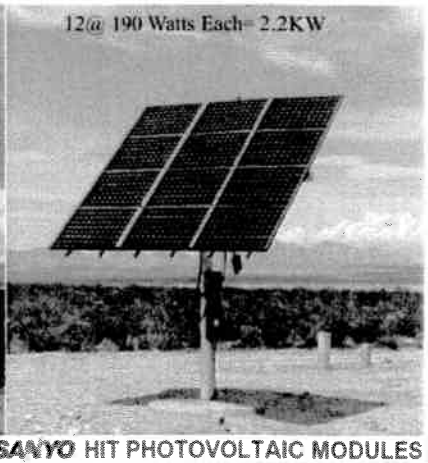


Typical Energy harvest for 1 day is 200KWH for Each Array



12 PV Modules with active trackers





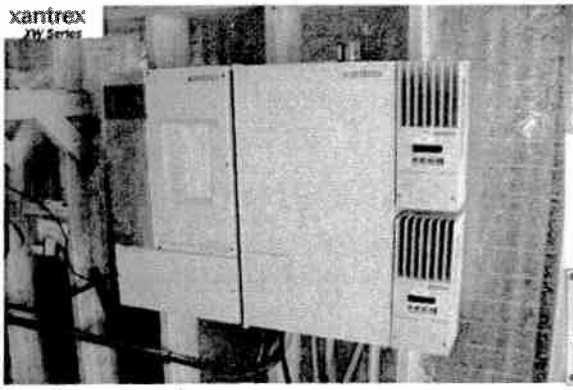
SANYO HIT Double
BIFACIAL PHOTOVOLTAIC MODULES

SANYO HIT PHOTOVOLTAIC MODULES

Cell Efficiency: 17.8% - 20.2%

Module Efficiency: 15.3% - 17.4%

Residence on # 10 Laguna

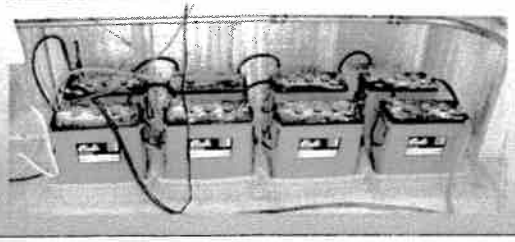


Xantrex XW Hybrid Inverter/Charger

The NEXT generation inverter/charger for renewable energy systems and backup power applications

MPPT

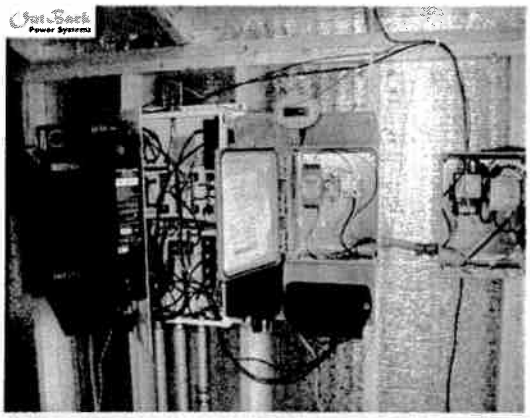
Remote Control



Sonnenschein

10 Year life
6Volts 350AH each
2 sets of 4 in series

Residence on # 12 Laguna



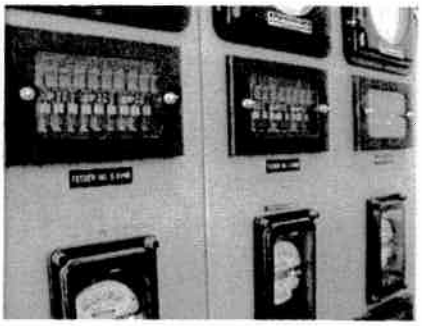
MPPT

Remote Control

Deka

5 Year life
6Volts 370AH each
2 sets of 4 in series

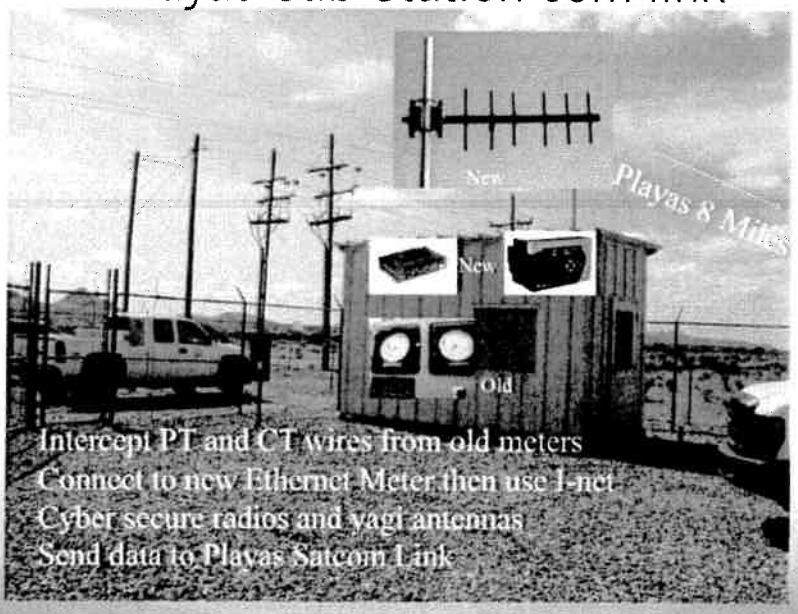
Playas Feeder at Sub Station



Old Analog Ink on Paper recorders
Will be updated with SCADA and
Remote 2 way communications

Measuring Power Draw from Playas at Feeder Connections

Playas Sub Station com link



New Mexico Tech Energy Project Summary

- Since 2006, the Playas Site has been planned as a National Test bed for Renewable and Conventional Energy Systems
- Working with the New Mexico Green Grid
- Perform system demonstration including cyber security, interoperability, control and communication infrastructure, including intelligent energy management and control systems
- Testing of different smart grid components at the substation and distribution level and getting "utility grade/utility acceptable data" that is measured and verified according to industry/DOE standards and guidelines.
- Perform modeling and simulation and validation based upon real time data
- Research next generation renewable energy systems including solar and algae based biofuels

New Mexico Smart Grid

Assets:

- Natural Resources
- Existing Federal Funding & National Labs
- Industrial Base
- University Base

Smart Grid will provide additive revenue to New Mexico through 2020 of $11.5B (EPRI Study)

Conclusion

New Mexico is positioned to be a leader in Smart Grid Technologies

Federal Funding requires matching funds